State of New Hampshire

West Nile Virus

Surveillance and Response Plan

2004 Season

Developed by:

The New Hampshire West Nile Virus Task Force

New Hampshire Department of Agriculture, Markets and Food
New Hampshire Office of Emergency Management
New Hampshire Department of Environmental Services
New Hampshire Fish and Game Department
New Hampshire Department of Health and Human Services
New Hampshire Department of Safety
University of New Hampshire Cooperative Extension
U.S. Department of Agriculture, Animal and Plant Health Inspection Service

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INTRODUCTION

The most effective way to combat the outbreak of an illness, and the fears that can accompany it, is to make sure the public has complete and accurate information. Knowing this, the New Hampshire Department of Health and Human Services, in conjunction with other state and federal agencies, immediately went to work in 1999 following the first signs of West Nile virus in New York, long before the appearance of West Nile in New Hampshire.

West Nile virus, a mosquito-borne disease, was first seen in North America in August 1999. Responding to an unusual outbreak of encephalitis in northern Queens, the federal Centers for Disease Control and Prevention (CDC) and the New York City Department of Health investigated and identified West Nile virus as the culprit. Sixty New York City residents were diagnosed with encephalitis and seven elderly residents died as a result. Later, voluntary testing of 677 people in the affected area of Queens found 19 more infected individuals, none of whom had experienced any serious symptoms.

In 2000, then Gov. Jeanne Shaheen created the West Nile Virus Task Force, comprised of a variety of state agencies, to develop a formal West Nile Surveillance and Response Plan for New Hampshire. Gov. Shaheen charged the Task Force with educating the public about West Nile virus, how it can be prevented, monitoring for evidence of West Nile virus in New Hampshire, and working with local communities to respond to any detected West Nile virus in our state.

During 2001, the WNV national surveillance system reported 66 human cases, including 5 fatalities that were spread all over the eastern seaboard of the United States. Most human cases reported during this two-year period were from highly populated urban areas.

New Hampshire discovered evidence of West Nile virus in birds, mosquitoes and horses during the 2001 season. It wasn't until the 2003 season that human cases were identified in NH. The West Nile Virus Task Force is working to help minimize the risk to New Hampshire citizens of being exposed to, and infected with this virus. This plan outlines New Hampshire's education, prevention, surveillance and response plans for West Nile virus. The Task Force annually reviews and revises this plan, it is updated as more and current information becomes known about West Nile virus.

Nationally, during the 2002 season, there was a dramatic increase in West Nile virus activity. The West Nile epidemic, according to the CDC, has been reported to be "The largest arboviral meningoencephalitis epidemic documented in the western hemisphere." All but 3 states in the continental United States had reported evidence of the virus in their surveillance activities. In 2002, there were 4156 human cases of West Nile virus in the U.S. Two hundred eighty four human deaths were attributed to the virus. WNV has been isolated from 26 species of animals, not including humans, birds, mosquitoes and horses.

The 2003 season continued to cause morbidity and mortality in the continental United States. There were a total of 9858 human cases reported to CDC, with 262 deaths attributable to

the infection. The Midwest was hit particularly hard, with 5928 (60%)of the total human cases reported form the states of Colorado (2947), Nebraska (1942) and South Dakota (1039).

After first appearing in New York, West Nile virus migrated north and south. On August 30, 2000 the NH Department of Health and Human Services (NH DHHS) identified West Nile virus in an infected dead crow submitted by a citizen from Manchester. By the end of the 2000 season, we reported 7 positive birds in the state. During the 2001 season, a clear increase and evidence of local transmission was established. The NH DHHS reported 86 positive birds (from the southeast part of the State), 3 mosquito pools (from Salem and Dover) and two horses (from Newton and Kingston). During the 2002 season, NH DHHS confirmed West Nile Virus infection in 119 birds and 33 mosquito pools. The distribution of birds and mosquitoes was in the southern half of the state. The trend continued through the 2003 season, 213 birds tested positive, as did 6 mosquito pools, 1 horse, and three humans.

Mosquitoes can become vectors (carriers) of West Nile virus when they bite infected birds. They can then pass the virus on to humans and animals. The primary mosquito species ("top 10") that have been identified as carriers of the virus are of the Culex species, although many other species have been identified as vectors. Public health officials at the federal, state, and local levels continue to explore the science of the disease, identifying the illness, its causes and vectors, and recommending and instituting prevention and control measures.

Most people infected with West Nile virus will never know they are, or they may experience mild flu-like symptoms. The elderly are considered at higher risk of developing more severe disease, the symptoms of which can include severe headache, high fever, stiff neck, confusion, loss of consciousness, and muscle weakness. In rare cases, the disease can cause death. That is why New Hampshire has acted early and aggressively to reduce the risk of human exposure to the West Nile virus.

West Nile virus is established throughout the United States and will be a continuing concern in future years.

FOCUS ON PREVENTION

The most effective protection against West Nile virus is education and prevention. Individuals can take a number of simple, common sense steps that will greatly reduce the risk West Nile virus will affect them, their families, and their communities. Choosing to wear protective clothing, using mosquito repellants, and minimizing opportunities for certain mosquitoes to breed are all important ways individuals can help prevent the spread of West Nile virus in New Hampshire.

The West Nile Virus Task Force is working to make sure New Hampshire citizens and communities have the information they need to make decisions about personal protection, home and community prevention activities, and response activities.

Prevention Through Knowledge

The goal of all West Nile virus public information activities is to provide New Hampshire's citizens with helpful, accurate and specific advice and information so they can approach this problem with the appropriate level of caution, not alarm.

Even before West Nile virus appeared in New Hampshire, the state launched an aggressive information campaign through the broadcast and print media, developed West Nile fact sheets, and hosted community education activities. Information on the following topics has been distributed in print, through various websites and through media activities:

- ✓ West Nile virus general information
- ✓ Health risk to humans and domestic animals from West Nile virus
- ✓ Personal protection from mosquitoes
- ✓ West Nile virus and birds
- ✓ Special information for the elderly
- ✓ Special information for schools, camps and daycare facilities
- ✓ How to minimize mosquito breeding opportunities in the backyard
- ✓ Mosquito biology
- ✓ Pesticides options for communities to use in West Nile virus mosquito control activities
- ✓ Numerous other fact sheets

Printed Materials

Fact sheets on the above topics and more are available for citizens and the media by calling the DHHS West Nile virus informational phone line 1-866-273-NILE (6453) or through the DHHS West Nile virus website (http://www.dhhs.nh.gov). Additional fact sheets and other printed materials are developed, and existing fact sheets are amended, as new information warrants.

West Nile Virus Website

The New Hampshire Department of Health and Human Services website, http://www.dhhs.nh.gov, serves as a central source for up-to-date, accurate, West Nile virus information. Information provided on the site includes general background information and regular updates on surveillance and laboratory analysis. Links to other West Nile virus informational websites, including community health departments, state and federal agency sites are included.

Informational Phone Line

During the surveillance season, a toll-free DHHS West Nile virus informational phone line, 1-866-273-NILE (6453), provides information to callers on a variety of topics. A staff member is dedicated to this line and is available to assist callers during business hours. Messages for a return call may be left after hours and are returned the next business day. Callers can

request printed fact sheets for more detailed information, or may be referred to another source for specialized information. The informational phone line has been widely publicized through the media and through posters and information cards that have been distributed annually on a statewide basis.

Media Activities

The New Hampshire media has demonstrated a strong interest in West Nile virus planning and response activities since April 2000. DHHS and partner agencies have worked cooperatively with media outlets statewide to communicate accurate information about West Nile. DHHS Public Information Office (603-271-4822) continues to serve as the focal point in the communication of West Nile virus-related messages to the media, with other task force partners participating as needed.

Community Education Programs

Prior to and during the surveillance season, Task Force partners conduct training for West Nile virus, including programs for municipal officials, their employees, and local health officers. Training addresses the transmission cycle and prevention and response strategies. Educational programs have included targeted groups such as senior citizens who are at greater risk of developing serious illness once infected.

Prevention Action Steps

Preventing Mosquito Breeding Opportunities

By reducing their exposure to mosquitoes around their homes and by eliminating mosquito breeding grounds, New Hampshire citizens can greatly reduce their risk of West Nile virus exposure. Mosquitoes lay their eggs in standing water. Weeds, tall grass, and bushes all provide an outdoor home for the common house mosquitoes that are most often associated with West Nile virus.

The New Hampshire West Nile Virus Task Force recommends citizens take the following steps to reduce opportunities for mosquito breeding:

- ✓ Eliminate standing water around residential and commercial areas and other mosquito breeding locations.
- ✓ Remove all discarded tires from your property. The used tire is the most common site for mosquito breeding in the United States.
- ✓ Dispose of or drill holes in the bottom of recycling containers left outdoors. These items include tin cans, plastic containers, ceramic pots, or similar water-holding containers. Drainage holes in the sides of containers will still allow enough water for mosquitoes to breed. Do not overlook containers that have become overgrown by aquatic vegetation.
- ✓ Make sure roof gutters drain properly. Clean clogged gutters in the spring and fall and as often as necessary to eliminate standing water.

- ✓ Clean and chlorinate swimming pools, outdoor saunas and hot tubs. If not in use, keep empty and covered. Do not allow these covers to collect standing water.
- ✓ Aerate ornamental pools or stock them with fish. Water gardens become major mosquito producers if they are allowed to stagnate.
- ✓ Turn over wheelbarrows and change water in birdbaths at least twice weekly. Both provide breeding habitat for domestic mosquitoes.
- ✓ Turn over plastic wading pools when not in use.
- ✓ Eliminate any standing water that collects on your property. Mosquitoes will develop in any puddle that last more than 4 days.
- ✓ Remind or help neighbors to eliminate breeding sites on their properties.

Personal Protective Measures

Citizens can take common-sense steps to protect themselves from mosquito bites. This is key to reducing the risk of West Nile virus infections. The New Hampshire West Nile Virus Task Force recommends that citizens take the following steps to protect themselves, particularly from June to October, when mosquitoes are most active:

- ✓ If outside during evening, nighttime and dawn hours, or at any time mosquitoes are actively biting, children and adults should wear protective clothing such as long pants, long-sleeved shirts, and socks.
- ✓ If outside during evening, nighttime and dawn hours, or at any time mosquitoes are actively biting, consider the use of an effective insect repellant. Repellants containing DEET (N, N-diethyl-methyl-meta-toluamide) have been proven effective. Use no more than 10% DEET for children and no more than 30% DEET for adults.
- ✓ Always use DEET according to manufacturer's directions.
- ✓ Do not use DEET on infants or pregnant women.
- ✓ Do not allow young children to apply DEET themselves.
- ✓ Do not apply DEET directly to children. Apply to your own hands and then put it on the child.
- ✓ DEET is effective for approximately four hours. Avoid prolonged or excessive use of DEET. Use sparingly to cover exposed skin and clothing.
- ✓ Wash all treated skin and clothing after returning indoors.
- ✓ Store DEET out of reach of children.
- ✓ Vitamin B, ultrasonic devices, incense and bug zappers have not been shown to be effective in preventing mosquito bites.
- ✓ Make sure that doors and windows have tight-fitting screens. Repair or replace all screens in your home that have tears or holes.

Mosquito Control Activities

It is important to emphasize that local communities make the final decisions regarding mosquito control activities in New Hampshire. The NH Departments of Health and Human Services, Agriculture, Environmental Services and Fish and Game are available to provide guidance and recommendations to assist municipalities faced with response decisions when West Nile virus is locally isolated.

All discussion regarding pesticide applications made under this plan will be in accordance with the principles of Integrated Pest Management. Integrated Pest Management (IPM) is a sustainable approach to managing mosquitoes by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks. IPM involves preventive control and suppressive control, including:

- ✓ Biological control (the use of natural enemies)
- ✓ Cultural control (the manipulation of the environment to make it less suitable for mosquitoes)
- ✓ Mechanical control (the use of barriers such as screens to prevent the movement of mosquitoes)
- ✓ Chemical control (the use of manufactured chemical products (pesticides) that act against mosquitoes)

Pesticides may pose their own risk to the health of humans and animals, plants and the environment. Thus pesticides are only one component of a coordinated effort to control mosquitoes. Both non-chemical and chemical treatments may be appropriate in certain situations, where either alone may not be adequate.

Integrated pest management dictates that control efforts should be tied to thresholds. This means simply that a certain defined risk needs to exist before particular control methods are recommended. Different responses may be made as different risks are identified. In the case of mosquito control to protect against West Nile virus these risks are discussed under the "Action Levels" section of this plan. In an ideal IPM program, non-chemical methods should be employed to keep pest levels below the risk level that might trigger a pesticide response, meaning that pesticides are a last, rather than first response to a West Nile virus problem.

The use of pesticides in New Hampshire is governed by state law and by the Administrative Rules of the Pesticide Control Board, Chapters Pes 100-1100. These statutes and rules require people applying pesticides, other than homeowners on their own property, hold licenses issued by the New Hampshire Department of Agriculture, Markets and Food. In certain circumstances, special permits are required in addition to licenses, examples being any larviciding treatments made to surface water or for adulticiding treatments within a public watershed, or along a public roadway. The Division of Pesticide Control at the Department of Agriculture, Markets and Food, in consultation with other interested state agencies, issues these special permits after all such agencies have reviewed the proposed treatment program.

Written into the permitting process is a requirement that applications take IPM principles into account when outlining a pest control program. The state, in its review of permit applications, will reinforce these principles through conditions written into the permits.

Although certain pesticide products are available for sale in the marketplace to control mosquito larvae, application of these products to any surface waters in New Hampshire is governed through permits obtained from the Department of Agriculture, Markets and Food, Division of Pesticide Control. Questions regarding how to apply for such special permits should be directed to the NH Department of Agriculture, Division of Pesticide Control at 603-271-3550.

SURVEILLANCE

Working in cooperation with the CDC, health departments in the United States are continuing activities aimed at detecting evidence of West Nile virus. The goals of these activities are to detect the entry of the virus into new geographic jurisdictions as early as possible so that prevention efforts may be aimed at reducing the risk to humans and livestock. By gathering as much information as possible about the geographic spread of the virus in the state, state agencies, communities, and individuals will have the information they need to make well-informed prevention and response decisions.

The CDC has determined that dead bird surveillance is the most sensitive indicator of West Nile virus's entry into a new geographic area. This determination has been established as fact in our state, with hundreds of dead birds having been tested positive for the virus over the past three seasons. In addition, mosquito surveillance and live wild bird trapping can help identify whether West Nile virus detections in birds represent local replication and establishment of the virus. Equine and human surveillance is also useful to detect disease and further help identify potential risk to humans.

The NH Department of Health and Human Services established a program for mosquito surveillance in 1998 intended to track the presence of Eastern Equine Encephalitis virus (EEE) in mosquitoes. Traps have been placed in selected Seacoast communities and were monitored from May through September of each year with viral testing performed at the Massachusetts State Laboratory Institute. In the two years of this program no arbovirus had been identified. The mosquito surveillance program was greatly modified in the year 2000 after West Nile virus was detected in the New York area in 1999.

The following sections describe detailed surveillance for West Nile virus in mosquitoes, birds, mammals, and humans:

Mosquito Surveillance

West Nile virus has been found in mosquitoes over the past three seasons. Data analysis shows that, in our state, positive mosquitoes are collected from mid August through the end of September.

For many states, mosquito surveillance, along with bird-based surveillance, is the mainstay of West Nile virus surveillance activity. Mosquitoes are the best indicator of human risk, and combined with bird surveillance, provide the most complete picture. The objective of mosquito surveillance is to determine the presence of arboviruses, including West Nile virus and Eastern Equine Encephalitis virus in mosquito species common to our area.

Surveillance activities in New Hampshire will coincide with the mosquito season, beginning in June and ending in October. Activities for mosquito surveillance for the 2004 season will consist of routine and "rapid response" surveillance.

Routine Mosquito Surveillance

The NH Department of Health and Human Services is the lead agency responsible for mosquito surveillance activities. Activities include:

- ✓ Coordinating efforts for appropriate placement of traps, collection, packaging and transport of mosquito specimens from the communities of Nashua, Manchester and other localities that may develop their own mosquito surveillance programs.
- ✓ Providing laboratory services for communities that submit mosquitoes for testing and informing municipalities of the results of those tests.
- ✓ Notifying municipal and other agency representatives within 24 hours of receiving results of positive virus isolation or a confirmed case of mosquito-borne diseases.
- ✓ Coordinating with and advising local health departments regarding surveillance activities, and prevention and control strategies.

The following outlines the process for mosquito collection. Target species for laboratory submission vary by disease pathogen of concern. For EEE virus, Culiseta melanura is the primary vector species. For West Nile virus, priority for testing, will be given to *Cx. pipiens, Cx. restuans, Cx. salinarius, Cx. nigripalpus, Ae. Albopictus, Ae. Cinereus, Ae. vexans, Oc. Japonicus, Oc. Triseriatus ,Oc. Sollicitans, Oc. Canadensis, An. Punctipennis, Cs. Melanura, Cq. perturbans*. Additional species may be added, based on national and regional epidemiological information.

Mosquitoes will be collected, frozen, sorted, packed in dry ice and sent to the NH DHHS Public Health Laboratories on a weekly basis. Mosquitoes will be grouped by species, site and week of collection into a group, or "pool" of 1-50 individual mosquitoes of the same species.

During the year 2004 routine mosquito collection will take place in the cities of Nashua and Manchester, performed by the Local Health Departments. Some other cities implemented their own mosquito control programs and DHHS will be testing mosquito sample from those cities (Seabrook, Stratham, Hampton, Plaistow, New London, Salem and Rye)

Activities for Rapid Response Mosquito Surveillance

In the case of a positive isolation of an arbovirus in horses, mosquitoes, humans, or if clustering of birds warrant, activities will include:

- ✓ Placing mosquito traps within a two-mile area surrounding the positive identification point. Criteria for selection of trap locations will include areas such as mosquito breeding locations, standing water, swamps and sewage plants.
- ✓ Reviewing and determining the need for expanding trapping to new areas.
- ✓ Notifying city and town municipal officials within 24 hours of receiving results of positive virus isolation or a confirmed case of mosquito-borne diseases.
- ✓ In the absence of local health department surveillance or local mosquito control program in predetermined selected areas, providing for mosquito surveillance and laboratory specimen preparation.
- ✓ Coordinating training and lending expertise to local health officials and state personnel involved in mosquito surveillance programs.

- ✓ At predetermined intervals or at the request of local health officials, providing on-site assistance with mosquito surveillance activities.

Bird Surveillance

Crows and blue jays (corvids) are the most sensitive measure of bird infection. Evidence shows that the mortality in these birds once infected is >95%. The state plan calls for timely reporting of all dead corvids, the development of a database to analyze dead corvid reports, and the submission of selected dead corvids for West Nile virus testing. The objective is to enhance surveillance for animal arboviral infection and neuroinvasive disease, including West Nile viral encephalitis, in order to improve our ability to promptly detect and control the risk of human outbreak.

Monitoring Dead Wild Birds

In keeping with the CDC's recommendations, this plan places a high priority on West Nile virus surveillance of dead wild birds. This involves a reporting system for sightings of dead birds to track possible increases due to an appearance of West Nile virus, and laboratory testing of selected dead birds to confirm presence of the virus.

Historically, information about rates and trends of bird mortality in New Hampshire has not been readily available. The effectiveness of ill or dead corvid reporting will be enhanced by collaboration with groups and individuals most likely to find ill or dead birds. This includes state agencies whose employees spend considerable time outdoors (Departments of Environmental Services, Transportation, Fish and Game Departments for example), United States Department of Agriculture, Animal and Plant Health Inspection Service, members of birding and outdoor recreational organizations (Audubon Society of New Hampshire), and residents of known flocking areas.

Dead corvids from across the state, which are not overtly traumatized or decomposed, may be reported and tested. Participating groups or private citizens may report observations of dead or ill birds with neurologic symptoms to their local animal control officer (or town-designated representative), health officer or health department. Citizens of municipalities without designated animal or health agents should call the toll free West Nile Virus information line, 1-866-273-6453. A systematic questionnaire that gathers Information will be collected by staff and entered into a database.

For the 2004 season, laboratory testing of dead birds will occur only if the community where the dead bird was located has the resources to collect and transport the specimen and the specimen has been previously approved for submission.

Animal control officers or conservation officers should report any bird deaths or illnesses to the toll free West Nile Virus information line, 1-866-273-6453. Questions about West Nile virus bird surveillance will be answered by calling the same toll-free West Nile Virus Information line number.

The NH DHHS Public Health Laboratories will provide laboratory testing on submitted dead birds that meet the criteria necessary to track the spread of West Nile virus in New Hampshire. Positive laboratory results will be communicated to the community's Health Officer. All test results will be posted on the DHHS West Nile virus website.

NH DHHS has developed a database to collect information about reported dead birds as part of the state's efforts to understand the movement and ecological uniqueness of West Nile virus. Weekly analysis of all reports will be performed. Depending upon the trends, DHHS may decide to stop testing birds from specific locations after repeated positive findings confirm an endemic situation in that area.

Mammal (Non-human) Surveillance

The objective of this component is to enhance surveillance for animal arboviral infection and encephalitis, including West Nile viral encephalitis, in order to improve our ability to promptly detect and control the possibility of a human outbreak. To accomplish this objective, the NH Public Health Laboratory or the NH Veterinary Diagnostic Laboratory may conduct laboratory testing of ill animals, under the auspices of the State Veterinarian, NH Department of Agriculture. The USDA National Veterinary Services Laboratory will be used as a confirmatory reference laboratory for New Hampshire's results as needed, within its capacity for testing.

On an annual basis, a letter, co-signed by the state veterinarian, describing the case definition, symptomatology and reporting process will be sent to all licensed veterinarians in the state of New Hampshire. This will serve as a reminder to investigate neurological illness in non-human mammals.

Mammals Submitted for Rabies Testing

In New Hampshire, mammals that have died of encephalitis are more likely to have died of rabies than West Nile virus. Unlike West Nile virus, rabies can be transmitted to humans by infected mammals through the bite of an infected animal. It is important that all mammals with neurological symptoms that have been exposed to humans, pets, or domestic animals, and that meet guidelines for rabies testing, be submitted for testing in accordance with the NH Public Health Laboratories guidelines.

The Public Health Laboratories has expanded its normal viral testing menu for arboviruses, including West Nile virus. The available testing is outlined below. All laboratory test results will be considered in conjunction with clinical symptoms and epidemiologic findings.

Organism Sample	West Nile Virus (WNV)	Eastern Equine (EEE)	St. Louis (SLE)	LaCrosse (LE)	Powassan virus
Human serology (IgM & IgG)	X	X	X	X	X
Human cerebrospinal fluid (IgM & PCR)	X	X	X	X	
Birds (PCR)	X	X*			
Mosquitoes (PCR)	X	X*			
Horse (PCR)	X	X	X	X	

X* = Only selected species of mosquitoes and birds will undergo testing for EEE.
PCR = polymerase chain reaction
Note: Testing depends upon availability of reagents

West Nile virus testing of dead mammals submitted for rabies testing will occur according to the following guidelines:

- ✓ WNV testing will be performed only on specimens from rabies-negative dead horses exhibiting neurological symptoms.

- ✓ The USDA National Veterinary Services Laboratory (NVSL) or CDC Laboratory will be used as a confirmatory reference laboratory for results as needed, within their capacity for testing.

Pets

Of all the types of bird/mammal surveillance systems for WNV, the testing of ill domestic animals seems to be the least sensitive method. Even when animals demonstrate clinical signs of encephalitis, it is unlikely the cause is West Nile virus. However, occasional cases of WNV infection may be detected by laboratory testing, particularly in horses, and such information will be used as part of surveillance efforts.

Parameters for evaluation and testing these ill animals for WNV include the following:

- ✓ Owned animals with neurological signs will initially be referred to private veterinarians for evaluation.
- ✓ Veterinarians wishing clinical consultation for encephalitis should contact the State Veterinarian at the NH Department of Agriculture, Markets and Foods, 271-2404.
- ✓ The State Veterinarian will assure appropriate collection of specimens for diagnostic testing, including for both rabies and West Nile virus.

Human Surveillance

Active Surveillance

Active surveillance for human West Nile virus cases will occur during the 2004 season. Infectious Disease Specialists and Neurologists will be contacted and inquiries made on an ongoing basis in order to improve case-finding of symptomatic patients who may have been overlooked for West Nile virus.

Passive Surveillance

The NH Department of Health and Human Services is the lead agency for the conduct of human case surveillance for arboviral encephalitis, meningitis, and meningoencephalitis. Starting June first and at least until October 31 (ending date to be determined based on ongoing epidemiological findings), NH DHHS is asking health care providers, emergency rooms and hospitals to report cases of encephalitis or aseptic meningitis that meet the following criteria:

CRITERIA FOR REPORT:

1. Any patient with viral encephalitis, who meet criteria a, b and c below:
   a. Fever ≥ 38.0 C or 100 F, and

   b. CNS involvement including altered mental status (altered level of consciousness, confusion, agitation, lethargy) and/or other evidence of cortical involvement (e.g., focal neurologic findings, seizures), and

   c. Abnormal CSF profile suggesting a viral etiology (a negative bacterial stain and culture with a pleocytosis [WBC between 5 and 1500 cells] and lymphocytopenia and/or an elevated protein level [> 40 mg]), with or without criteria d.

   d. Muscle weakness (especially flaccid paralysis) confirmed by neurologic exam or by EMG.

2. Any patient with presumptive aseptic meningitis. This includes symptoms of fever, headache, stiff neck and/or other meningeal signs along with laboratory evidence of CSF pleocytosis with predominant lymphocytes, moderately elevated protein, and a negative gram stain and culture.

3. Guillain-Barre syndrome, especially with atypical features, such as fever, altered mental status, and/or pleocytosis.

Note: Severe neurological disease due to WNV infection has occurred in patients of all ages. Year-round transmission is possible in some areas. Therefore, WNV should be considered in all persons with unexplained encephalitis and meningitis**.**

Based on the analysis of the clinical presentation and the laboratory results the patient will be classified by Bureau of Disease Control staff as a case or not a case, based on the following criteria:

Confirmed Case

A confirmed case of West Nile encephalitis is defined as a febrile illness associated with neurologic manifestations, ranging from headache to aseptic meningitis or encephalitis, plus at least one of the following laboratory criteria:

- ✓ Isolation of West Nile virus from, or demonstration of West Nile viral antigen or genomic sequences in, tissue, blood, cerebrospinal fluid (CSF), or other body fluid;
- ✓ Demonstration of IgM antibody to West Nile virus in CSF by IgM-capture EIA; (ELISA)
- ✓ A fourfold, or greater, serial change in plaque-reduction neutralizing antibody titer (PRNT) to West Nile virus in paired, appropriately timed serum or CSF samples;
- ✓ Demonstration of both West Nile virus-specific IgM (by EIA) and IgG (screened by EIA or HI and confirmed by PRNT) antibody in a single serum specimen.

Probable Case

A probable case is defined as a febrile illness associated with neurologic manifestations ranging from headache to aseptic meningitis or encephalitis, without any of the laboratory criteria listed above, plus at least one of the following laboratory criteria:

- ✓ Demonstration of serum IgM antibody against West Nile virus (by EIA); or
- ✓ Demonstration of an elevated titer of West Nile virus-specific IgG antibody in convalescent-phase serum (screened by EIA or HI and confirmed by PRNT).

Non-Case

A non-case is defined as an illness that does not meet any of the above laboratory criteria, plus:

- ✓ A negative test for IgM antibody to West Nile virus (by EIA) in serum or CSF collected 8-21 days after onset of illness; and/or
- ✓ A negative test for IgG antibody to West Nile virus (by EIA, HI, or PRNT) in serum collected ≥22 days after onset of illness.

Human surveillance activities also include:

- ✓ Alerting hospitals and clinicians about the importance, criteria, and requirements for reporting, along with instructions for submission of appropriate laboratory specimens (CSF, acute and convalescent sera for arboviral encephalitis and WNV testing).

- ✓ Providing clinical and epidemiologic information about human cases of West Nile virus and criteria for reporting and laboratory testing to all New Hampshire hospitals, neurologists and infectious disease physicians. These will be followed by monthly updates to hospitals.

- ✓ Contacting the major commercial laboratories to remind them of the requirement to report patients with positive arboviral serology (including SLE). The NH Public Health Laboratories will decide on a case-by-case basis the need for further testing.

Laboratory Testing of Human Serum Specimens for West Nile virus will be conducted. All suspect human cases should be reported to the NH DHHS Bureau of Communicable Disease Control at 603-271-4496. BCDC staff will screen reports to determine if the clinical presentation meets the case criteria for West Nile virus neurological illness. If the case meets surveillance criteria, the hospital or physician will be contacted and requested to submit the appropriate diagnostic specimens for testing. The NH Public Health Laboratories will take responsibility to assure that appropriate viral testing for WNV is completed.

Health care providers will be asked to submit the following specimens for testing:

- ✓ CSF for testing by IgM capture ELISA and RT-PCR.

- ✓ Sera, both acute and convalescent, for testing by IgM Capture and IgG ELISA.

The Department of Health and Human Services and local health department staff will help assure the collection of convalescent sera on all suspected case-patients with encephalitis of unknown etiology.

DHHS and local health officials will work with hospitals and physicians to encourage testing for those patients who meet case definition criteria for West Nile Virus neurological illness, as listed above. Patients with milder illnesses (e.g., fever and headache, fever and rash, fever and lymphadenopathy) or no symptoms (e.g., persons with recent mosquito bite but no acute symptoms) may not need to be tested for WNV. However, if the physician strongly requests testing for these milder or asymptomatic cases, then the NH PHL, coordinated through the BCDC, will offer testing on a non-priority basis for a fee.

The expected “turn around time” for results is one week from the time the specimen is received.

Active Surveillance

Active surveillance for human West Nile virus cases will occur during the 2004 season. The WNV program coordinator will work with a selected group of Infectious Diseases Specialists and Neurologists who will be contacted weekly to inquire for the number of cases they have seen that meet the criteria for probable or confirmed case of WNV invasive disease as described in the previous section. A cross match with the results from the passive surveillance system will be performed in an ongoing basis in order to improve case-finding

RESPONSE

Public Health Notification Levels

For each new season that West Nile virus (WNV) is confirmed in New Hampshire or that human cases are confirmed in bordering states (Massachusetts, Vermont or Maine), DHHS, in consultation with other state and local agencies, will evaluate the potential threat to human health. Following evaluation of the data obtained from public health surveillance activities, the West Nile Virus Task Force will recommend that prevention and control measures be implemented in proportion to the risk of WNV infection. Each risk level is described below, along with specific recommended responses. An outbreak is defined as the presence of more than one human case of West Nile Virus neurological illness in a confined geographic area or municipality.

Prevention and control measure recommendations will be determined on a case-by-case basis, in cooperation with task force partners and municipal officials. In accordance with Integrated Pest Management principles, action levels serve as "thresholds" for local municipal decisions regarding mosquito control measures.

Level I Notification - Risk of human outbreak is possible but low

A Level I public health notification exists when WNV is confirmed in a New Hampshire town through:

- ✓ One or more positive birds; or
- ✓ Mosquitoes collected at a single mosquito trap location that has tested positive.

Confirmation of WNV will be based upon evaluation of biologic samples taken from birds or mosquitoes using virus isolation or other diagnostic test procedures.

Level 1 responses will include:

- ✓ West Nile Virus Task Force members, or their representative, contacts the health officer in the affected community(ies) and inform him/her of the situation and discusses response recommendations and the logistics of such implementation.

- ✓ Expanding efforts to disseminate information on prevention and control methods to local health officers, elected government officials and the public. The educational message should emphasize the importance of mosquito breeding site reduction for target species in residential and commercial locations. In addition, educational efforts in affected areas will also specifically target the elderly, who are at a higher risk for severe WNV illness. These efforts will emphasize the simple steps people can take to protect themselves, including wearing protective clothing and/or insect repellant.

- ✓ Public education efforts reinforcing the importance of reporting dead birds from the location and surroundings.

- ✓ Evaluating the need and feasibility of increased mosquito trapping in the area of the virus isolation. The decision to do so will be based on ecological conditions, time of the year and density of human population.

- ✓ Considering appropriate mosquito reduction alternatives, including the application of larvicide, following IPM criteria. Criteria for making this decision will include: time of the year, extent of previous mosquito control activities, current level of mosquito activity, weather conditions and bird and mammal mortality surveillance results.

- ✓ Evaluating the need and feasibility of live bird sampling.

- ✓ If not already applied for, local officials will consider applying for a pesticide application permit.

Level II Notification - Risk of human outbreak is possible

A Level II public health notification will be in effect when WNV is confirmed in a New Hampshire town through:

- ✓ A horse or other domestic animal, without history of travel to known WNV endemic areas; mosquitoes collected at more than one trap location in a town;

- ✓ Multiple mosquito species, collected at any trap location; or,

- ✓ A single infected person, without positive birds or mosquitoes discovered locally, if it is found the person was infected in New Hampshire.

Responses at this level will include, all of the responses in Level 1, plus:

- ✓ Evaluating the need and feasibility of increased mosquito trapping beyond town lines. This decision will be based on ecological conditions, time of the year and density of human population.
- ✓ Developing enhanced active human surveillance activities, as previously described.

- ✓ Re-considering appropriate mosquito reduction alternatives, including larvicide application following IPM criteria.

- ✓ Considering targeted adult mosquito reduction activities, including ground-based pesticide application. Criteria for the decision making process to determine if effectiveness is likely will include: mosquito species isolated, extent of previous mosquito control activities, current level of mosquito activity, weather conditions, bird and mammal mortality surveillance, time of the year, density of human population and network of roads in the affected areas.

Level III Notification - Risk of human outbreak is likely

A Level III public health notification will be in effect when evidence exists that the virus presents serious risk to human health based upon a high level of West Nile virus activity as evidenced by:

- ✓ A single infected person; and

- ✓ Confirmation of West Nile virus in multiple mosquito species, including bridge vector species, and at multiple mosquito trap locations or in multiple cases involving birds or other mammals.

Response at this level will include all of the responses in levels 1 and 2, plus:

- ✓ Re-considering appropriate mosquito reduction alternatives, including larvicide application, following IPM criteria.

- ✓ Re-considering targeted adult mosquito reduction activities, including ground based pesticide application.

Level IV Notification - Outbreak in progress

A level IV Public Health notification will be in effect when conditions exist that favor the continued transmission of WNV to people as evidenced by multiple human cases in one confined geographic or municipal area.

Response at this level will include all of the responses in the previous levels, plus considering broader geographic adult mosquito reduction activities, across town lines, including ground-based pesticide application.

In the event of a West Nile Virus outbreak, the Governor may declare a Public Health Emergency pursuant to RSA 107 C:5.

Factors that will influence modification of these recommendations, include, but are not limited to, the following:

- ✓ Species of birds which test positive for WNV locally

- ✓ Number of birds which test positive for WNV locally

- ✓ Species of mosquitoes which test positive for WNV locally
- ✓ Number of pools of mosquitoes which test positive for WNV locally
- ✓ Length of time until a killing frost
- ✓ Success and extent of prior mosquito control activities
- ✓ Species of mammals which test positive for WNV locally
- ✓ Number of mammals which test positive for WNV locally
- ✓ Proximity of WNV-positive animals to human populations
- ✓ Local bird population levels
- ✓ Local mosquito population levels
- ✓ Density of roads and accessibility of mosquito-breeding areas
- ✓ Weather conditions including rain, wind, and drought
- ✓ Prevalence of WNV in the local human population
- ✓ Density of human population

This document was prepared under the auspices of the New Hampshire West Nile Virus Task Force comprised of representatives of the below listed agencies, and revised by the West Nile Surveillance Program Coordinator.

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